

# **X-431 Pad Service Manual**

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## Revised Record

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## Chapter 1 Basic Knowledge

### 1.1 Automobile Population

Till Aug.16th, 2011, the global vehicles which are in use is over 1 billion, among which there are cars, trucks and buses. America has the most vehicles. The registered vehicles are over 240 million. Till the end of August, 2011, China's vehicle ownership is up to 219 million, among which the motorbike's percentage is 54.12%, around 119 million. Car ownership is 45.88% of the whole volume, just over 100 million. Japan has 7.4 million vehicles.

According to the statistical data, the global car average ownership is 1:6.75, which means that 1 out of 6.75 people owns a car. In America, the ratio is 1:1.3; in France, Japan and Britain, the ratio is 1:1.7; in China, the ratio is 1:17.2.

In 2011, the global sale of new light vehicle is 7.65 million, which is 6 percentages higher than that of 2010 and also breaks the 70 million sales record made in 2007. The new emerging markets including China, India and Brazil, will continuously expand on the basis of 51% of the global vehicle ownership. Generally speaking, the emerging markets will take up 53% of the total light vehicle sales in 2011. This indicates that the new emerging markets will be the key factor that stimulates the development of the market.

The Asian auto market will continuously maintain good development in future. This area went through more than 25% of the growth in 2010. It's estimated that in 2011 Asian market will increase 7%-8%, and the sales volume will take up 42% of the global sales. Among which, China's auto market increase will still be very obvious.

The situation of each area: in 2011, the production and sales amount of vehicles in China is 1.84189 and 1.85051 million, which increases 0.84% and 2.45% than same period of last year. Among which, the passenger car sales of the country's self-own brands is over 6.1122 million, which decreases 2.56% than same period last year.

America's light vehicle sales of 1.16 million outnumbered North American market, which increases 11% than 2009's sales of 1.04 million.

Canada finishes the sales volume of 1.6 million which increases 7% than last year.

Brazil takes up 75% of the total sales of South America.

Australia reaches the second highest sales volume of yearly sales in 2010.

The vehicle renew plan of western European governments was quitted in 2010, which leads the decrease of the sales. It's estimated that even till 2012, the western European market is still unpleasant.

### 1.2 Automobile Malfunctions

#### 1.2.1 Definition

The components or assembly are partly or completely lost their operating abilities.

## 1.2.2 Classifications

- 1) Existing time
  - Intermittent: Appears only in the short time when the problems have been existence.
  - Continuous: Can be troubleshoot after components have replaced.
- 2) Occurred time
  - Abruptness: Without any sign, coincidence, can not be detected by diagnosis
  - Gradually: Technical conditions deteriorated by the abrasion, weariness, deformation, corrosion, and ageing, etc. Can be detected by earlier diagnosis.
- 3) Performance affected
  - Functional: The automobile can not carry on its functions, e.g. steering failure, wandering drive, etc.
  - Parameter: The performance parameter can not reach its standard, e.g. engine power declined, fuel consumption increased, emissions exceeded the standard, etc.
- 4) Consequences
  - Slightly: Can be expelled by suitable adjustment
  - General: Replace wearing parts or expelled in a short time by using tool box
  - Severe: Main parts were severe damaged.
  - Deadly: Cause vicious incidents.
- 5) Artificial and Natural

## 1.2.3 Common Malfunctions

For the common fault, they can be determined from the abnormal of vehicle performance and appearance symptoms by experience, sensory and equipment. Common faults are:

- 1) Abnormal Performance  
Abnormal performance of the car is because of the poor power and economy, mainly in the significantly lower maximum speed, poor vehicle acceleration performance; consuming large quantities fuel and engine oil. Poor vehicle ride comfort, vehicle vibration and noise increased significantly. Poor vehicle operating stability, goes wandering easily, shimmy the front; braking deviation, braking distance too long or no braking.
- 2) Abnormal Operation Conditions  
The abnormal phenomena suddenly occurred during vehicle operating, should be prevented: sudden engine flameout during the driving; can not brake when the car need to; can not start in winter; can not start after engine flameout; steering suddenly failed in driving; what's more, the burst tyre, and car spontaneous combustion and so on. The symptoms are obvious, but have more complicated causes: Mainly because the internal fault was not noticed, and developed into a sudden damage.
- 3) Abnormal noise  
The abnormal sound happened during driving, is the car fault "alarm." The car driver should be aware of a problem when heard the sudden abnormal sound, and stop the car immediately and check, must not let the vehicle "ill operating."

Abnormal noise is the easiest way the trouble to be showed during the operating. It can be heard by the driver and the occupant under normal circumstances. The experienced people can judge the problems by the location of the noise, sound frequency and the timbre: Generally speaking, the heavy sound with strong vibrating associated with more serious failure, the vehicle should be stopped, lower the engine speed or shut down the engine to find the problem; some noises due to some of the parts is faulty, that does not affect the driving, and it can not check out soon, drive the car back to the base or the garage nearby and go for check by the experienced personnel.

#### 4) Unpleasant Smells

People are very sensitive to the unpleasant smells, especially in car driving. Determine first to find out whether it's the car or not. The car smell mainly are the burning smell produced by non-metallic friction material on the brake and clutch; the specific odor of battery electrolyte; burning smell from automotive electrical system and wire. Sometimes the sticky burning smell of the leaked engine oil and abnormal gasoline smell can be smelt. They all should be adequately noticed.

#### 5) Overheat

The vehicle overheating means each part of the vehicle temperature is beyond the normal automobile temperature range. Engine overheating can be significantly shown on the boring of the radiator; transmission overheating, rear axle overheating and brake overheating can be shown by hand touching or water test. Further examination should be place to discover the deep causes, it does not influence driving due to a long time with high load; if the case of internal organs malfunction, should be timely diagnosis and excluded.

#### 6) Abnormal Exhaust Gas Color

Cars in operation, if brake dragging, clutch slipping happened, will emit a burning friction plate smell; engine overheating, lubricating oil goes into the combustion cylinder, it will divergence a special odor; burning smell can be sensed when short circuit and grounding wire.

In the course of the engine, the normal combustion products should be the main component of carbon dioxide and a small amount of water vapor. If the engine abnormal combustion, the exhaust will be mixed with incomplete combustion of carbon particulates, hydrocarbons, carbon monoxide and a lot of water vapor. In addition, nitrogen oxides, etc., then the color may be black, blue or white. That color is not the normal exhaust smoke. For gasoline engine, the normal should be no visible exhaust smoke. But the oil goes up to cylinder, it will become blue; incomplete combustion will be black; and when oil mixed with water, the exhaust is white.

The gas color that Engine exhausted appears the engine working condition. Exhaust smoke from the engine combustion normally have a certain color, and it changes when the engine is not working properly. Blue exhaust when the engine oil is burning, that means engine needs repairing; for the incomplete engine combustion, the exhaust is black, fuel should be changed or adjust the ignition timing; when engine exhaust is white, say, there is water in the oil or cylinder, the fuel or the engine should be checked.

#### 7) Leakage

Leakage is defined as an automobile engine fuel, lubricating oil (or gear oil), brake fluid (or air), and the power steering fluid leakage, etc.. It is also obvious failure symptoms, careful observation can be found. For example, compressed air leaks, you can clearly hear the sound of air leakage. Leakage performance of automotive fuel leaks, oil leaks, coolant leak, brake fluid

leakage, steering oil leakage, oil leakage and refrigerant leakage, as well as battery fluid leakage of the electrical system and electrical system leakage and so on. Car overheating car easily cause leakage and institutional damage. Prone to leak oil as vehicle steering failure; easily cause brake fluid leakage, etc. brake disorder.

#### 8) Appearance Disorders

Car parking space in the flat when, check the appearance of the sometimes find vehicle longitudinal or horizontal skew deviation, showing the appearance of disorders. Check the tire pressure should be noted, frame and suspension damage, body damage and other irregularities. Disorders may affect the appearance of car to car use. Such as cars center of gravity shift, severe vibration, steering instability and cars deviation and so on.

#### 9) Abnormal During Driving

Driving different cars can not usually manifested by the will of the driver to speed up and the steering and braking, car control mechanism can be perceived failures and implementing agencies, in addition to the accelerator pedal, brake pedal, clutch pedal and steering wheel and transmission institutions to check and adjust, but also should conduct a comprehensive inspection. Find fault, and normal maintenance then the car can be used.

### **1.3 Automobile Detection**

#### **1.3.1 Definition**

The use of modern detection techniques and equipment for disintegration vehicle inspection and test, its purpose is to determine the technical condition of vehicles and the ability to work.

#### **1.3.2 Content**

- Security: including braking, sideslip, steering and headlamp testing.
- Reliability: including automobile abnormal noises, wearing, deformation and crack detection.
- Dynamics: including speed, acceleration, chassis power output, engine power, torque and ignition system, fuel system status detection.
- Economic: including fuel consumption test.
- Regulations adaptability: include status of vehicle noise and emissions testing.

#### **1.3.3 Classifications**

- 1) Safety Performance
  - Content: Only test the safety.
  - Objective: To ensure that the car has to meet the requirements of the appearance, safety, noise level, emissions targets, to enhance vehicle safety.
- 2) Comprehensive Performance Test
  - Content: test car safety, reliability, power, economy and environmental protection, etc. five main performances.

➤ Objective: the disintegration of the car is not the case, determine the capacity and technical status of transport vehicles to improve transport efficiency and reduce consumption, make the transport vehicle having good economic and social benefits.

3) Maintenance-related vehicle inspection

➤ Content: Only detect the vehicle safety, environmental protection and the speed in power performance.

➤ Objective: According vehicle inspection, to determine the need for major repairs, to find the exact failure location and cause to improve the quality of maintenance.

## **1.4 Automobile Diagnoses**

### **1.4.1 Definition**

By the inspection, analysis, determine the completion of a series activities; it's a test of automotive technology status, aimed at identifying the causes and exact location.

### **1.4.2 Classifications**

1) Diagnosis by experience

Mainly depends on the artificial observation, analysis and logic reasoning, often in conjunction with the disintegration of the repair work carried out. Diagnosis of slow, poor accuracy, requiring diagnosed a wealth of practical experience and high technical level.

2) Diagnosis by equipment analyzing

Using a variety of testing instruments and equipments for a variety of automotive data and by using the data to determine the technical condition of the car, without disintegration. Diagnosis speed very fast, high accuracy can be quantitatively analyzed with large investment.

## **1.5 Automobile Repairs**

Vehicle repairs are car maintenance and car repairs in general.

➤ Auto Maintenance: To maintain the technical condition of vehicle and ability to work for the job. Can extend vehicle's service life, safe and reliable; fulfill its effectiveness.

➤ Auto repair: technical condition for the resumption of vehicle capacity and service life or work carried out the operation. Extend vehicle life; protect the car for continued use.

## **1.6 Automobile Decoder (Diag. Tester)**

### **1.6.1 Definition**

Quickly and accurately acquire vehicle engine performance and fault information through the connection and communication with ECU.

## 1.6.2 Market Background

**With the increasing degree of automotive electronics, which inevitable arouses a great changes of car decoder markets.**

In recent years, with the rapid development of automotive research and manufacturing technology, vehicle electronics becomes more and more popular. Customers drive their cars for more safety, comfort and stability. This brings new requirements for repair. As the basic equipment in the field of automotive repair, the market of scanner has changed a lot. New requirements are demanded for the scanner in the automotive field.

The process in science and technology has changed the vehicle from "machine with four wheels" to "computer with four wheels". Most operations are controlled by electronic control technology. Nowadays, the electronic control technology is applied in many systems, such as:

- Powertrain system: Engine system (ESA, EFI, EGR, and ISC, etc.), AT, and Immobilizer, etc.
- Chassis System: ABS, ASC, CCS, and Collision Avoidance System, etc.
- Body system: Cluster system with information display and alarm, Navigation, Communication, Automatic A/C, Automatic Seat, and Audio System, etc.

As the operations on vehicle tend to electronic control, the electronic control system diagnosis is playing an important role in the development of an automobile maintenance enterprise. The traditional experience in repairing can not meet the current needs of automobile development. The advanced maintenance equipment is an essential part in repairing.

## 1.6.3 The birth of LAUNCH diagnostic products

LAUNCH, as the pioneer of auto aftermarket, has been at the forefront on the R&D of automotive after-market products in the industry. In 1994, LAUNCH has taken the lead in developing the first generation of domestic automotive diagnostic computer-431ME which owned independent intellectual property rights, which established a precedent in the domestic automotive diagnostic industry and lead China automobile repair industry into a new era. The concept of "electronic eye" come from LAUNCH has now been widely accepted and been consistent use in the industry, which represents the creativity and pilot of LAUNCH company in the industry. After that, company continuously developed a serial of new automotive decoders, also popular on the markets, such as ADC2000, X-431 Super scanner, X-431 TOP, X-431 TOOL, X-431 Diagun etc.

With 20 years of automotive diagnostic technology experiences, LAUNCH Tech.Co. Ltd heartfelt produces X-431 PAD integrated intelligent automotive failure diagnostics, which fully represents enterprise and its culture in 2012. This is the first significant diagnostic product after LAUNCH enters into the Telematics.

## Chapter 2 Industry Knowledge

### 2.1 History of Product Development

#### 2.1.1 Development of the Automobile Electronic Technology

##### 2.1.1.1 Fast Development of the Electronic Technology

In the past 10 years, the automotive industry two significant changes occurred. First, the growth point is by European and American markets from Asian countries to developing regions of the market-based transfer. Data show that from 2007 to 2012, Asia and Europe will dominate the global vehicle production 89%, BRICs and other Asian countries will become the main force of automobile consumption. Second, the mature European and American countries in the market, improve the car's performance more dependent on electronic technology. Studies have shown that from 1989 to 2005, electronic equipment manufacturing costs in the proportion of the vehicle, from 16% to 30%. In 2011, each IC's cost about the new car at 360 dollars will be 3% to 4% annual growth rate has continued to grow.

Automotive electronics technology development and large-scale applications are from the 20th century began in the late 70s, and 70s from the 20th century to 80 years, roughly experienced three stages of development.

The first development stage before 1971 began production technology from a low alternator, voltage regulator, electronic flash, electronic horn, intermittent wiper devices, car radios, electronic ignition and digital clock and so on.

The second development stage is 1974 to 1982. Integrated circuits and below 16-bit microprocessors' application on the car is the sign. Including electronic fuel injection, automatic door locks, programmable driving, high-speed warning system, automatic lighting system, automatic defrost control, ABS, vehicle orientation, collision warning sensors, electronic timing, electronic transmission, closed-loop emission control, automatic cruise control, security systems, vehicle fault diagnosis and other electronic products. Most representative of this period is the development of electronic fuel injection technology and anti-lock braking (ABS) technology matures, making the car's major mechanical functions to control the use of electronic technology. However, at this stage mechanical and electrical connection is not very satisfactory.

The third stage of development from 1982 to 1990, the microcomputer applications in the car becoming more reliable and mature, to the intelligent direction. Tire pressure control of the development of products, digital oil pressure meter, anti-sleep device, traction control, all-wheel steering control, look into the instrument panel, voice synthesis and recognition, electronic load regulator, electronic road monitors, cellular phones can be heated windshield, reverse warning, speed limiter, automatic rearview mirror systems, road condition indicators, electronic cooling control and the parasitic power control.

Since 2005, it can be said to enter the automotive electronic technology the fourth stage of development. Microwave systems, multi-channel transmission system, ASKS-32-bit microprocessor, and digital signal processing applications, so that communication and coordination-oriented system, automatic anti-collision system, dynamic optimization system, autopilot and electronic mapping technology have been developed, particularly is the emergence

of intelligent vehicles.

### 2.1.1.2 Electronic Technology Requirement for Automotive Industry

- Power
- Economy
- Safety
- Comfortable
- Environment Protection

### 2.1.1.3 The Applying Of the Automobile Electronic Technology

- Engine management system
- Automobile trouble self diagnosis
- Identification technology based on figure
- Automobile network communication technology: CAN/ FlexRay/MOST

## 2.1.2 Automobile Network Communication Technology

### 2.1.2.1 The rapid development of automotive harness

To improve the performance of the introduction of a large number of car electronics systems, leading to the rapid increase in wiring harness, and a significant increase in the wiring harness has hindered the further improvement of vehicle performance. Therefore, we must find a new technology and reasonable solution to the problem. Twentieth century, the early eighties there car network communication technology, is the best way to resolve this contradiction. Below:

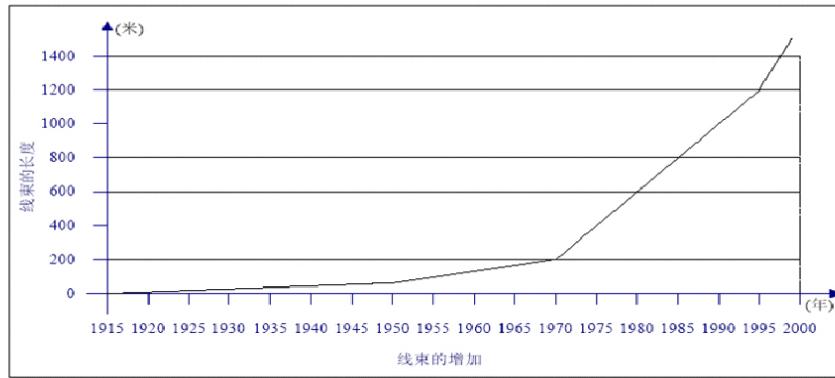


Figure 1 Trends for the Harness Number of the Volvo

### 2.1.2.2 Typical Network for Modern Automobile

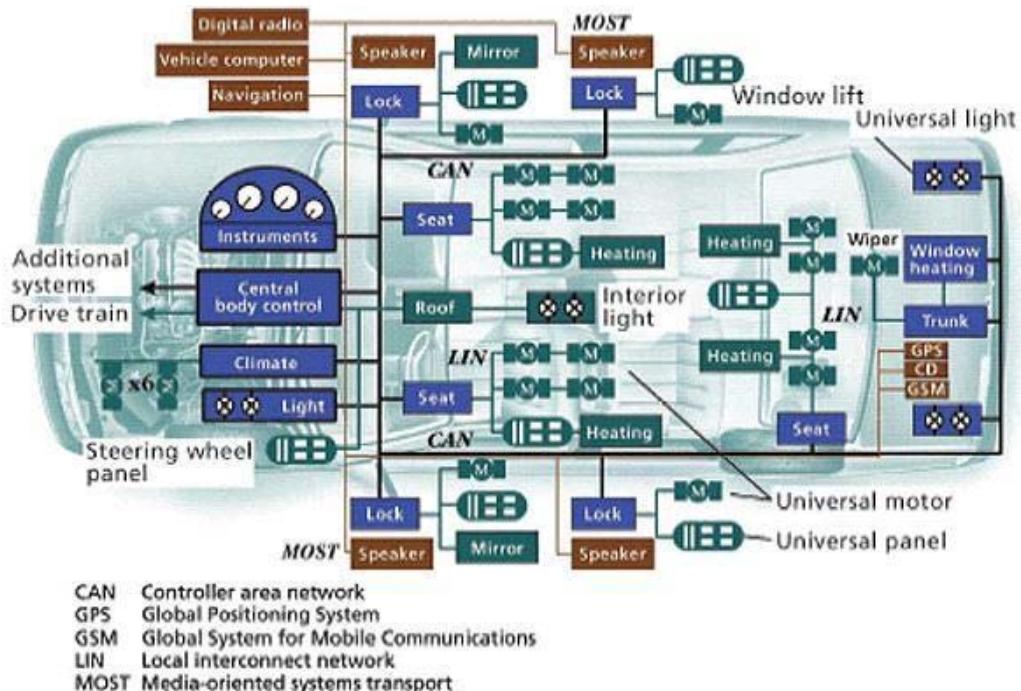


Figure 2 Typical Network Diagram for Modern Automobile

### 2.1.2.3 Classifications for the automobile network

It can be divided into the following five categories by functions and velocity:

- 1) A class: low-speed network for the actuators, sensors
  - A major class network for sensors, actuators, control.
  - Bitrates is generally 1 ~ 10Kbps, main types of network protocols: LIN, UART, CCD, etc.
  - Suitable for less demanding real-time occasions, mainly used in body control, such as electric windows, central locking, mirrors, seat adjustment, lighting, vehicle fault diagnosis of early
- 2) B class: data sharing between modules for medium-speed network
  - B class network protocol mainly for data sharing between separate modules, suitable for real-time less demanding situations, in order to reduce redundant electronic components.
  - Bitrates is generally 10 ~ 125Kbps, main types of network protocols: ISO11898-3 (fault-tolerant CAN), J2248, VAN (Vehicle Area Network), J1850 (OBD2), etc.
  - Mainly used in electronic vehicle information center, fault diagnosis, instrument display in the control
  - With the automotive network technologies, current and future mainstream B-class network protocol will be: CAN (ISO11898-3)
- 3) C Class: Multi-oriented, real-time closed-loop high-speed network
  - Mainly for high-speed, real-time closed-loop control of multiple control multiplexing network
  - Bit rates up to 10Mbps or more, the main types of network protocols: ISO11898-2

(high-speed CAN), TTP (Time-Triggered Protocol) / C, FlexRay, etc.

- Mainly used in power systems, real-time control and high reliability requirements of the occasion
- Currently, C class networks are widely used in power and transmission system control and communication protocol standards: ISO11898-2, the next applied to X-By-Wire system, the main agreements: TTP / C and FlexRay

4) D class: for information, the network multimedia systems

- D class of intelligent data bus networks collectively referred to as IDB (Intelligent Data Bus), mainly for information, multimedia systems, etc.
- According to SAE Category: IDB-C (low): SAEJ2366; IDB-M (high speed): D2B, MOST, IDB1394 etc.; IDB-Wireless (Wireless Communications): Bluetooth, etc.
- D class of network protocols, the bit rate at 250Kbps ~ 400Mbps between

5) E Class: occupant safety systems for

- E class networks mainly for occupant safety systems used in the field of passive safety of vehicles
- Bit rate is usually in 20K ~ 10Mbps, network protocol types are: SafetyBus, Planet, Byteflight etc.

### **2.1.3 Development of the Automobile Decoder**

Automotive detection technology develops with automotive industry. In the early stage of automotive development, specified detection upon a wealth of practical experience. That is, depends on the artificial observation, analysis and logic reasoning. Along with the process of modern science technology, especially computer technology, automotive detection technology rapid develops. Nowadays, people rely on a various advanced equipment to test vehicle without disintegration. More important, it is safe, rapid, and reliable.

In shortly, automotive decoders, is a special equipment, which upon the connection between the PC data output and DLC with purpose of data exchange in various ECU. Decoder is divided into original and non-original decoder. The original automotive decoder is provided or designated by automotive manufactories, such as Benz STAR2000, BMW GTI, Volkswagen (Audi) VAS5052, TOYOTA INTELLIGENT TESTER, Nissan CONSULT 1/11, etc. General speaking, each automotive manufacturer has the original code detector of all kinds products which would be able to provide better aftermarket detection services. However, the non-original decoder is not provided and designated by the automotive manufacturer, instead of other equipment supplier. Such as KTS300/500 from Bosch (German), Scanner MT2500 of Red Brick from Snap On (USA), OTC from SPX Corp. Ltd, CARMAN from Korea, LAUNCH (Shenzhen), Beijin JBT, Shenzhen FCAR from domestic (China).

The development of automotive Decoder group into the following FIVE stages:

- LED Code: It was the earlier automotive detection solution. Connection with LED was between ground and signal cable. Base on the frequency and time duration of lighting, and refer to LED CODE TABLE, would be able to diagnose the automotive fault position and reason.
- Code Reader: It was the earlier automotive code reader to read the fault code in ECU. Refer to FAULT CODE TABLE to identify the automotive fault position and reason.
- Detection Device (Class A Network): Earlier general diagnoses device, with code reader,

clearer, data steam in part system and easy motion testing function, but no CAN BUS function.

➤ Original Decoder (Class A&B Network): Original fault diagnostic device, with fault diagnoses function for signal brand of automotive manufacturer, mainly produce for custom-made servicer factories and 4S stores.

Intelligent Decoder (Compatible for Class A,B,C,D,E Network): Most common diagnostic device, similar to X-431, X-431 Diagun, X-431 PAD from LAUNCH.

## **2.2 Competition Analysis**

### **2.2.1 Overseas Competition Analysis**

NO.	Company	Snap On	BOSCH	TEXA	SPX
1	<b>Company introduction</b>	Headquarters: America Wisconsin China Shanghai Is the world biggest professional tool and equipment manufacturer. Products cover 150 countries globally. Its products have a very good reputation and are the first choice for many leading companies.	Headquarters: America: Wisconsin China: Shanghai BOSCH group is the world leading technology and service supplier. It's majoredin auto technology, industrial technology, consumables and construction intelligence technology. The group includes Robert Bosch GmbH and its 300 branches over 50 countries.	Headquarters: Italy This company is the top class company for diagnostic equipment in Europe. Its products can be used on cars, motorbikes, commercial vehicles and farm vehicles.	Headquarters: Muskegon America SPX is the original equipment supplier for many auto manufacturers. It's a listed company and its annual income is 5 billion USD. It provides diagnostic equipments, professional tools, technology information service for 15 countries for the last 100 years.
2	<b>Development history</b>	1, Founded in 1920, listed on New York stock market in 1941, annual sales volume is 2.5 billion USD. Among S&P 500. 2, In 2004, SNAP-ON established its first Asia manufacturing center in Kunshan, Jiangsu Province, China. 3, The birth of the first generation of red box can be dated back in 1988. This product comes back to China in 2011.	Founded in 1886, acquired the Kingtec which has 10 years history of decoder's research and development. In September, 2011, Nanjing new factory began to build. Products cover spark plugs, Brake component, auto diagnostic system.	Founded in 1992	In 1912, named Piston Ring, the main business then was to design and manufacture original auto parts for the biggest auto company. In 2008, it acquires Cheboshi, AUTOBOSS and OTC. The acquisition of Kent-Moore symbolizes that its business shift from professional spare parts manufacture to auto dealing and repair market.
3	<b>Company goal</b>	Provide the most valuable production force solution for customers.	Outstanding partner of Chinese auto aftermarket	Goal: Become the most trust worthy partner, benchmark for auto ECU diagnosis and relevant service work. Prospect: refuse "second best" maintain the pioneer position.	The company culture is comprised by leader standard and value procedure.
4	<b>Company strategy</b>	Creative design, precision processing	1, Globally manufacture, sales and after-sale service. 2, The annual R&D investment is more than 3 billion Euros. Applied for more than 3300 patent in 2007 alone. 3, The EST system developed by BOSCH covers spare parts, system info., and data almost contain all models. 27,000 sedans, 15,100 commercial vehicles, 5,700motorbikes和8,000special vehicles,etc. Ensure update every season so as to maintain the accuracy and timeliness.		1, SPX is d standard maker of diagnosis. It developed 53 original equipments for GM,TOYOTA,VW,BMW,RENAULT,NISSAN,etc. 2, Auto diagnostic and service products have reached more than 2500 types world wide. 3, permanent value maintenance
5	<b>Sale and marketing mode</b>	Established 15 branches, developed more than 300 dealers, established sound channels.	1, train how to promote products 2, after-sale business concept:"spare parts+diagnosis+service" It provides hardware (BOSCH spear parts, check equipment) and software (technology document, training, management concept) as auto professional service. 3, Based on the double advantage of software and hardware, BOSCH established more than 1200 professional auto repair stations, diesel system service centers and diesel system repair stations which form the biggest independent after-sale service network.		SPX's all diagnostic products are distributed globally. Cheboshi is just a brand of SPX, SPX hopes to use Cheboshi to quickly enter China's market.

NO.	Company	Snap On	BOSCH	TEXA	SPX	
6	<b>Product type</b>	Sub-brands of SNAP-ON group: Snap-on, Sioux, ATI, Bahco, Blue-Point, Lindstrom, CDI, Williams, John Bean, Hofmann, Cartec manual and electrical tools diagnostic software information and management system workshop equipment other solutions of auto dealers and repair centers Blue-Point detective instrument: redbox Blue-Point tool: general tool and special tool	diagnostic software auto maintenance equipment, electrical tools auto electronics Main force products: KTS, MTS series	car, truck, motorbike, farm vehicle, yacht diagnostic equipment workshop equipment diagnostic software auto dealer and service center's other solution Main force products of diagnosis: AXONE series : AXONE 4, AXONE Palmtop, AXONE Pad, AXONE Direct(support Wired)	1.The main brands of the company are OTCgenisys, PCMAX, AUTOBOSS,etc. AUTOBOSS and OTC have different appearance but their software are the same which indicates that they share the same technology. 2, AUTOBOSS is the main product; the annual sales volume of it in America alone is 30,000. 3, Cheboshi V30 diagnostic product enhance SPX's confidence to enter the mid to low-end market. V30/PCMAX has added repair and help function. One type product has emission analysis and <a href="#">oscilloscope</a> function	
7	<b>Technology features</b>	1, Using its unique angle, changed mechanics working mode, 10 times improved efficiency, products considered mechanics and human engineering. 2, own 626 American patents and 1100 patent in other countries. 3, passed UL, CCC, JET, ISO9001, etc. certification	1, Elegant appearance, fast start speed, normal operation methods. 2, Jinde KT670, the function of BOSCH system is very strong, for example, high voltage test, low voltage test, start test, etc. Data flow is also very comprehensive, useful repair documents is prepared too.	Module level is high. Can be bought as per needs.	1, SPX auto service plan formed in 1997 contains the life period of an auto. 2, leading diagnostic repair help function is its major technical feature.	
8	<b>Customer segmentation</b>		Vehicle manufacture, repair industry, education industry		Europe, America and China vehicle manufacture	
9	<b>Sales volume and market share</b>			Sales volume is around 50 million USD. Turnover of 2009 is 48 million.	Takes up 30% of the auto-after market in America, the diagnostic products take up less than 5%, Cheboshi's sales volume ranks top 3 in China.	
10	<b>Market price</b>	<b>product</b>	Solus Pro EESC328W	KTS670	Axone 4	REFLEX
		<b>dealer price</b>	2100 USD	5780 USD	4500 USD	1200 USD
		<b>diagnostic price</b>	4000 USD	7450 USD	7000 USD	2300 USD
11	<b>Others</b>	The first generation REDBOX comes back to China market in 2011.	After Germany and America, China has become the third biggest market for BOSCH	TEXA becomes SPA company in 2002	Acquire Cheboshi in 2008, launched representative product V30. BOSCH acquires SPX service solution department which will help BOSCH become a leading diagnostic solution supplier. Especially in the field of car diagnostic business.	

## 2.2.2 Domestic Competitors Analysis

NO.	Company	JNBENTENG	FCAR	AUTEL	XTOOL
1	Company introduction	It has two R&D centers in Beijing and Nanning. It has over 300 dealers in China. Capital cities have service centers. It has over 100 dealers and 15 branches covering Asia, Europe, America and Africa.	Founded in Shenzhen in 2007. It combines diagnostic products' R&D, manufacture, and sales. It establishes long-term cooperative with Shanghai Yatai, Jinbei Haixing, Chongqing Aimote, Liaoning Xinfeng Group, Russian Diagnostic Systems Company, Dongfeng Company.	Shenzhen Autel Technology Co., Ltd was founded in 2004. So far, Autel's products cover diagnostic equipment, decoder, EPB repair tool, TPMS diagnostic tool, engine oil return to zero, traveling data recorder, industrial endoscopes.	Shenzhen Langren Technology Co., Ltd. was founded in the early 2010. there are 30 software engineers. Diesel vehicles inherited FCAR's technology, gasoline vehicles major overseas developing data.
2	Development history	Founded in 1999 Launched "Caisheng" series in 2007 SMS vehicle faults remote diagnostic system- "Car Doctor" Vehicle faults remote intelligent diagnostic instrument- "Car Eye"	Founded in Shenzhen in 2007, launched the first product F3-VW in 2008. Will launch F6D diesel diagnostic instrument in 2012.	Launched decoder in 2005, Launched MaxiDAS® in 2010, Established branch company and R&D test base in America in June, 2006.	Founded in Beijing in 2010, Launched gasoline version of gasoline vehicle fault diagnostic equipment in 2012 in Beijing expo.
3	Company goal	"Everyone has a decoder" 1, fill in gaps in the auto ECM data communicative product (including self-diagnostic products), form the industry standard. 2, provide detecting equipment and self-diagnostic products for domestic auto manufacturers and car owners. 3, establish open auto repair network based on internet. Have remote diagnosis and online technology support function data website with a large number of users. Become one of the most effective domestic Chain internet service supplier of auto detect and maintenance provider in Auto aftermarket	Mission: provide the customer the best cost effective product. Vision: compete globally and revitalize Chinese auto maintenance industry Goal: through featured service to establish FCAR as the first brand in the diesel diagnosis industry.	Vision: deeply understand customers' needs; strive to become the leading supplier of the automotive electronics and automotive intelligent tools. Goal: become the leading supplier of automotive diagnosis and analysis equipments and solutions. Constantly expand the scope and competitiveness of automotive diagnostic products.	
4	Company strategy			Pursue the best quality of new developed products insist the business philosophy that based on the product.	
5	Marketing and service mode	Develop middle and small size dealers.	Become the first to achieve the goal of lifetime warranty service for products hardware in the auto aftermarket industry.	Main market is foreign countries and gradually expands the domestic market. Already established sale channels and send service personnel to America, Mexico, Germany, France, Spain, Italy, etc.	The future market will mainly locate in foreign countries. Already explored Taiwan market. Meanwhile, it's the agent for brands like OTC, AUTOCOM and DENSO.

NO.	Company	JINBENTENG	FCAR	AUTEL	XTOOL
6	<b>Product type</b>	1,Decoders of Jinbenteng TypeI,TypeII,TypeIII, GDT, Shenzhouxing series, Caisheng series and commercial vehicle series. 2, car doctor; similar to high level code reader, can individually choose car model software, mainly point at individual users. 3,car eye: check faults trough SMS	F6-D Diesel diagnostic instrument FD800 internet educational system F3 enhanced version series F3-D diesel vision F3-A gasoline Asia version F3-W gasoline global version F3-G diesel and gasoline version F1-D diesel version	1、MaxiScan®, MaxiDiag™ 系列 2、MaxiDAS® DS708 Cover diagnostic instruments, code reader, EPB repair tools, TPMS diagnostic repair tools, engine oil return to zero instrument, vehicle traveling data recorder, and industrial endoscopes. 1, automotive code reader: MaxiScan®、 MaxiDiag™ series, 2, automotive diagnostic and analysis system: MaxiDAS® DS708	Covers the ECU refresh and adjustment tool, Automobile assembly line testing equipment, automotive electronic control system detective instrument, automotive fault tester, instrument for Vehicle maintenance of lights to zero iobd2, individual diagnostic products for mobile phones (OBD II/E0BD) X-VCI, Mini PS2, the design is similar to Diagun II, stands out portable. PS2(diesel vehicles); wireless Bluetooth diagnosis
7	<b>Technology feature</b>	Four technology original inventions: personalized design, data recording save print, warning display for out of scope, self-taught judgment function. Two features: value adding and intelligence. IMS Zhi duoxing comprises diesel decoder.	1,product mainly focus on diesel vehicles, from diesel cars to engineering machinery; 2,apply module design technology, includes two high performance modules, high performance vehicle information communication modules and diagnostic data processing modules, data exchange is trough communication line between the two modules. 3, diagnostic data processing module applies 32 bits CPU, the program is very easy update and change. 4, energy comes from vehicle computer, can adapt the voltage from 9V to 27V, the internal energy protection design can protect the instrument's safety when energy breaks down.	1,increased many new functions, e.g. programming not only decoding, so is called vehicle diagnosis and analysis system; 2,Obey the rules of FCC, CE, RoHS etc. 3, has the widest and deepest systems of the global vehicle models.	1,almost develops entire special functions for Weichai,Yuchai,Dongfeng Kangmingsi,verified can do Weichai idling speed adjustment function, 2,use cheap pirate edition original factory diagnostic software and VCI box to maintain the service for dealers, 3, free open vehicle models repair data, includes circuit diagram, special function operation methods for certain models, anti-theft setting and key matching checking manual etc.
8	<b>Customer segmentation</b>	Education industry, repair industry, auto manufacturer, large motorcade, individual user.	First and second type auto repair enterprises, 4S stores, auto manufacturers, engine manufacturers, new energy enterprises, petrochemical enterprises and transport enterprises.	Automotive repair industry	engineering machinery, repair industry, individual users
9	<b>Sales volume and market share</b>	above 10%		100 million sales volume in 2011	
10	<b>End user price</b>	<b>product</b>	Caisheng	F3-D Diesel Version	PS2 Heavy Duty
		<b>Dealer price</b>	4800RMB-5000 RMB	5000-6000 RMB	6500-6800 RMB
		6800 RMB	9000 RMB	5000-5800 RMB	9500-11000 RMB
11	<b>Others</b>				

### 2.2.3 Product Competition Analysis

PRODUCT	X-431 PAD	X-431 3D/GDS	Verus Pro	KTS 670	ISCAN II
Picture					
Operation System	Embedded WIN 7	Embedded WIN XP/XP PRO	Windows XP	Windows XP	Windows XP
Display	9.7 inch IPS Touch Screen	7 inch TFT Touch Screen	12.1 SVGA {800*600} TFT Screen	12.1 SVGA {800*600} TFT Screen	5.7 inch TFT Touch
Processor	Dual-core 1.6GHz	1GHz 32bit			1GHz 32bit
RAM	2GB	1GB	1GB	1GB	128M
Memory	16GB Electronic Hard Disk	8GB Electronic Hard Disk		40G	40G
Cable Network	YES	YES	YES	YES	YES
Wireless Network	YES	YES	YES	YES	YES
Manual			YES	YES	YES
VGA Extension	YES	YES		YES	
Battery	7400mAh				
Weight	3Kg	2. 5Kg	2. 2Kg	4Kg	2Kg
Camera	130M pixels				
HDMI Extension	YES				
Size (L X W X H ) mm	307 X 214 X 67				340 X 175 X 85
Endoscope Extension	YES				
Upgrade	One Key/Manual/PC/U-Drivers	Manual/PC/U-Drivers		Online	Online
Data Stream Display	Data/Graph	Data/Graph	Data/Graph/Simulation	Data/Graph	Data/Graph
Multiple Grounds	4、6、12	4	Max 12	Max 12	
Heavy Trucks		YES			
Diesel Vehicle	YES	YES	YES	YES	YES
Passenger Vehicle	YES	YES	YES	YES	YES
System Recovery	YES				
Printer	Thermal Printer	Thermal Printer			
Power	DC12V	DC12V/24V	DC12V	DC12V	DC12V
Boot time	35 seconds	47 seconds	15 seconds	25 seconds	10 seconds
Diagnostic Mode	Bluetooth/Cable Access	Cable	Bluetooth/Cable Access	Bluetooth/Cable Access	Bluetooth/Cable Access
Coverage	Asian European AmericanDomestic	Asian European AmericanDomestic	Standard America, part of Asian and European	Standard European, America Asian needs purchase	Asian American European
Screen Capture	One Key	Software	Software	Software	Software
Camera	YES				
Voice	YES			YES	
Chitchat (CC)	YES				
OBC	Option	Option	Standard	Standard	Option
Sensor simulation and test	Option	Option		Standard	
Battery Test	Option	Option			Option

## **2.3 Sales and service modes**

- The sales modes applied in the industry are distribution and direct sales, and the service mode is that the distributor or the manufacturer serviceman arranges one to one actual training.
- About the equipment maintenance, it shall be carried out by the manufacturer for domestic. And be carried out by the distributors for overseas, the related personnel to the headquarters of the training required.

## Chapter 3 Product Knowledge

### 3.1 Brief introduction

X-431 PAD is the new generation tablet diagnostic scanner of LAUNCH for DBS (Diagnosis Based Solution) car system, configured with Windows Embedded Standard 7 OS, built-in printer and DBScar connector, with wireless (Wi-Fi) and Wired Network, One-click update and vehicle diagnostic functions (via Bluetooth communication).

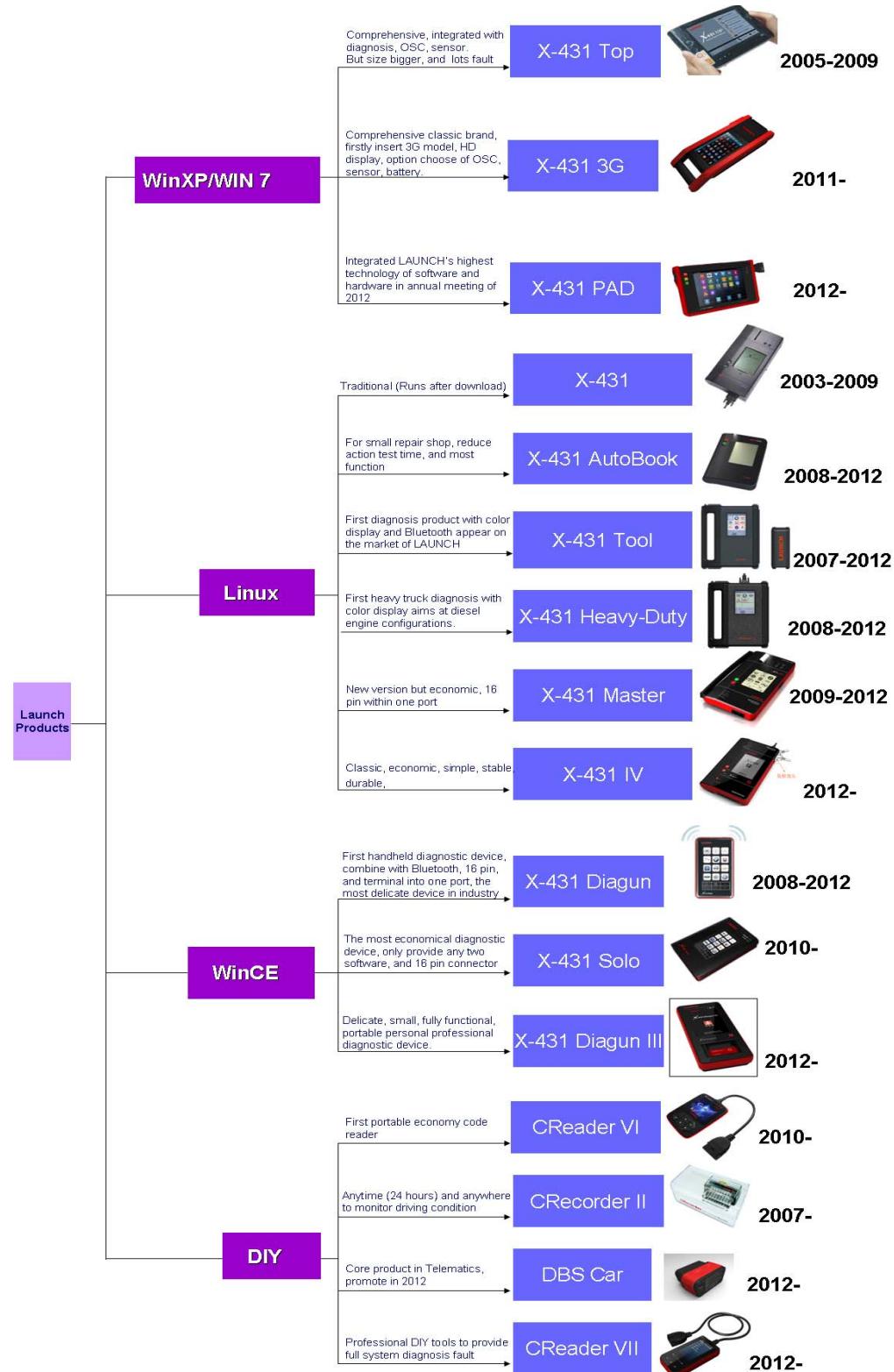
Extended functions: VGA/HDMI projection, Oscilloscope, Engine ignition analysis, Sensor simulation and test, Multimeter, Battery test, and Borescope.

Color touch screen, Easy operation.



Figure 3 Appearance of X-431 PAD main unit

### 3.2 Product history



### 3.3 Working Principle of Product



Figure 4 X-431 PAD Working Principle Diagram

### 3.4 Product Configuration

#### 3.4.1 Introduction of X-431 PAD Complete Unit

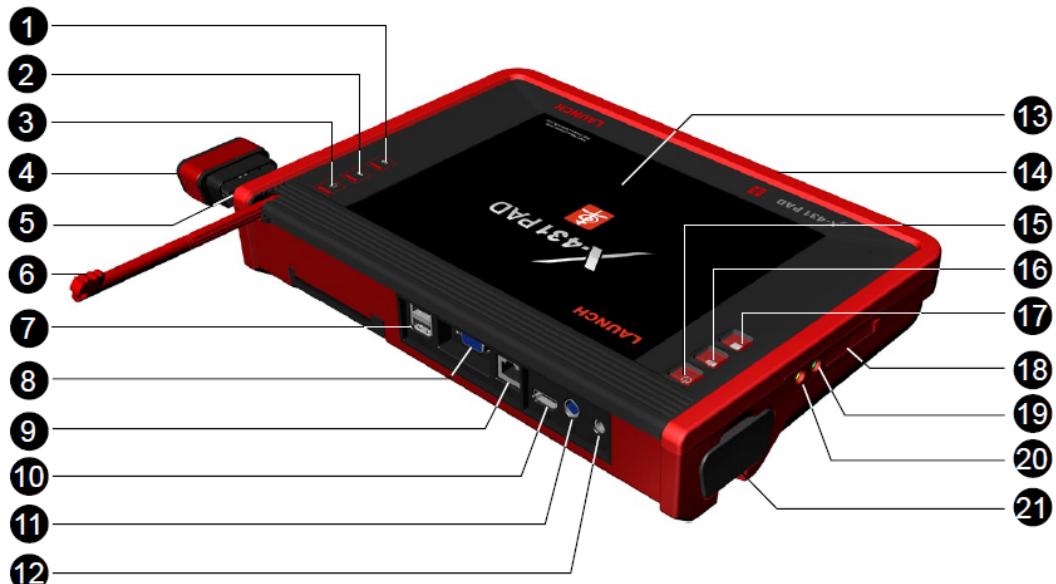


Figure 5 X-431 PAD Frontal Structure Diagram

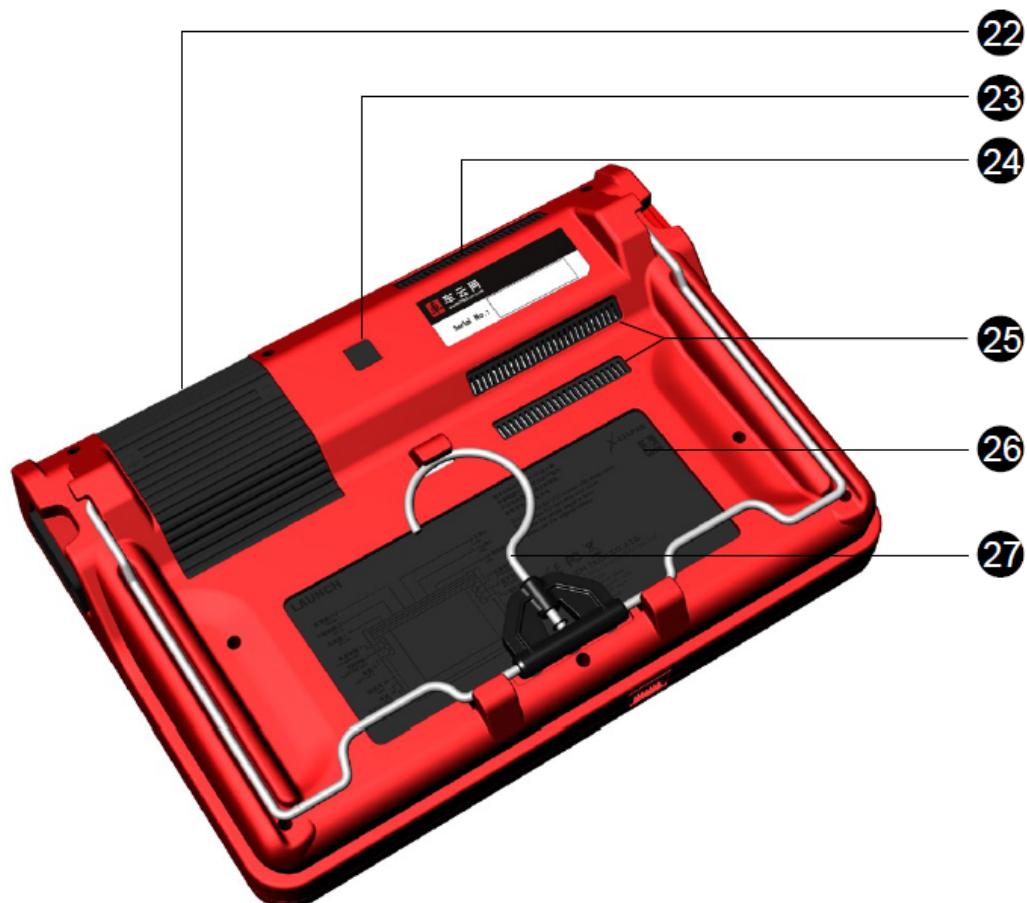


Figure 6 X-431 PAD Behind Structure Diagram

No.	Name	Descriptions
1	Communication indicator	It flashes while X-431 PAD communicates with DBScar diagnostic connector.
2	Bluetooth indicator	It lights up while Bluetooth is activated.
3	Power indicator	It lights up while X-431 PAD is on or in use.
4	DBScar diagnostic connector	To communicate with X-431 PAD main unit.
5	Slot for DBScar diagnostic connector	Only for housing DBScar diagnostic connector
6	Stylus	For clicking operation
7	USB port	To connect USB devices. While extending X-431 PAD function, it is to be connected to Scopebox, Sensorbox or batterybox.
8	VGA port	To connect an external projector or monitor etc

9	Ethernet port	To connect Ethernet cable for wired network
10	HDMI port	To connect an external projector or monitor with HDMI interface
11	Borescope interface	To connect an Borescope
12	Power interface	To connect the included power adaptor
13	Touch screen	Color touch screen for displaying. On-screen keyboard and handwriting input are supported.
14	Charging slot	Place X-431 PAD on the charging base (optional) for charging.
15	Power button	Press once to turn it on; keep it pressed for while to turn it off.
16	Camera/video button	for photographing or video recording
17	Screen capture button	To capture the current screen
18	SD card slot	To store SD card
19	Audio out port	To connect earphone
20	Audio in port	To connect audio device, such as amplifier.
21	Cover for DBScar diagnostic connector holder	Remove the cover and connect the DBScar diagnostic connector to the DLC simulator for user experience or demonstration.
22	Printer	To print the result out
23	Camera lens	To take photos or record video
24	Buzzer & air vent	To exhaust heat to ensure a normal temperature.
25	Air intake vent	
26	Battery cover	7400mAh lithium polymer battery is installed below it.
27	Hook/stand	Use fingers to lift the hook up, then hang it on the target object; To place it on a desk, unfold the hook as an stand to support X-431 PAD.

### 3. 4. 2 Configuration Accessories

Accessories in X-431 PAD are adaptable, but configuration would be different according to different markets, including diagnostic software, testing port. Details refer to local agent or random distribution from X-431 PAD configuration packing list.

No.	ERP Number	Name	Qt.	Descriptions	Pictures
1		X-431 PAD main unit	1	To connect X-431 PAD main unit to DBScar diagnostic connector	

2		DBScar diagnostic connector	1	To connect to vehicle's DLC.	
3		DBScar USB cable	1	To connect X-431 PAD and DBScar connector	
4		Cigarette cable	1	To obtain power supply from vehicle's cigarette lighter	
5		Power adaptor	1	To convert 100~240V AC power supply to 12V DC power supply.	
6		Stylus	1	For clicking or writing on the screen	
7		SD card (optional)	1	For extending memory	
8	199010001	OBD II extension cable	1	Extension cable for port and diagnosis socket	
9		Thermal printing paper	1	Information printer	

### 3.4.3 Standard Configuration

Hardware in this product only supports fault diagnostic for the cars, and unity for the following two configurations:

1. 301180018 X-431 PAD OVERSEA Configuration, open for whole oversea regional market.
2. 301180003 X-431 PAD PROFESSIONAL Diagnostic Configuration, only for Chinese regional.

### 3.5 Product Function

- a) **Compact Structure, Strong Hardware Configuration:** 1.6GHz Dual-core CPU processor, 9.7 inch HD IPS screen, built-in thermal printer, and diversification interface, to meet customers personalized needs.
- b) **Rich Multimedia Device:** integrated with camera, video, and projection output.
- c) **Unique Screen with 12 set Data Flow Waveform Display:** Display multiple (MAX 12) groups data flow waveform figure clearly in a screen , which would be convenience for failure fast analysis and judgment.
- d) **Custom-made Remote Collaboration Function**
- e) **Combining with modern communication technology, as the first high-end diagnosis product in DBScar application from LAUNCH Corp. Ltd:** completely adaptable to mainstream communication mode, such as WiFi, Bluetooth, 3G., and satisfy 2-3 years relevant commercial products inspection.
- f) **Diversity Internet Application: Provide online update, feedback and query. Simultaneous, supply full open browser, and switch access LAUNCH www.dbscar.com directly.** Similarly AllData (USA) and AutoData (Euro) professional website supply relevant data and information queries conveniently to solve work working questions and services support. A few website would require charging for database services.
- g) **ONE KEY which is variation, convenient, efficient:** Provide multiple functions, such as ONE KEY Screen Capture, ONE KEY Upgrade, ONE KEY Feedback, ONE KEY Switch, and ONE KEY Recovery, to solve general operation questions in system, which lead to greatly improve work efficiency.
- h) **Flexible and Convenient Operation:** Supply different operation, as desktop placing, steering wheel setting, handheld and suspension hood use mode.
- i) **Extensive Models Coverage:** inherited all functions in X-431 series products function, which is the most widely coverage of comprehensive diagnosis products, It covers 220 different automotive modes, over 90% automotive market in Asia, Euro, the United States, and 2500 different diagnosis software.
- j) **Special Features:** Accompany with 20 years diagnostic technology experience, continuous development base on basic diagnosis functions, would extend many special features covering different forms of products.

**Main functions:**

- Read ECU information
- Read DTCs
- Clear DTCs
- Actuation test
- System basic setting
- Read data-stream
- Read independent channel data
- Match channel
- Control unit coding
- Terminate test communication
- System log in

### 3.6 Main Parameters of the Product

- 1.6GHz Dual Core Processor

- Memory --- 2GB.
- Hard Disk --- 16GB SSD
- Battery --- 7400mAh, 7 hrs
- 9.7" TFT IPS Wide Screen
- 1.3 million pixels (640 x480 resolution) camera
- High speed thermal printer
- VGA&HDMI

### **3.7 Packing & Transportation**

The packing box of X-431 PAD is made of PVC, which is not inflammable and high resistance against force and chemical corrosive. It can provide strong protection for the product. This material is not easily flammable, high strength, resistance to climate variability and excellent geometric stability, oxidants, reducing agents and strong acids have a strong resistance.

#### **3.7.1 Packing**

Use of carton box for packing:

Packing Size: L600mm×W170mm×H415mm

Net Weight: 9Kg

Gross Weight: 10Kg

#### **3.7.2 Transportation**

The following transportation package size and weight data for reference, check the invoice for the specific configuration of the transport packaging

Packing Size for Export (six boxes in one carton)

Size: L1056mm×W618mm×H440mm

Net Weight 为: 60Kg

Gross Weight:: 62Kg

Packing Size for Export (container in size of 20")

Size: L5890mm×W2350mm×H2390mm

Full load in 6 container, 111 cartons or 666 units

## Chapter 4 Installation and debugging requirements

### 4.1 Quick Start Guide

<p><b>DBScar Diagnostic Connector</b></p> <p>OBD 2 16 PIN connector Communication indicator Power indicator Micro USB port</p> <p>Remember to remove the DBScar diagnostic connector from the DLC if it keeps unattended.</p> <p><b>DLC Location</b></p> <p>NEAR CENTER OF DASH</p>	
<p><b>Install DBScar diagnostic connector</b></p> <ol style="list-style-type: none"> <li>Locate vehicle's DLC socket: it provides standard 16 pins and is generally located on driver's side, about 12 inch away from the center of dashboard. See Figure DLC Location. If DLC is not equipped under dashboard, an label indicating its position will be given. In case no DLC is found, please refer to Automobile Repair Manual;</li> <li>Plug the DBScar connector into the vehicle's DLC (It is suggested to use the OBD II extension cable to connect the DLC and the DBScar connector). For vehicles with non-16PIN DLC, please choose the desired connector. Normally the power indicator of DBScar diagnostic connector will light up.</li> </ol>	
<p><b>Connections, Register &amp; Diagnose</b></p> <p>1. Prepare (Connection) --&gt; 2. Power on --&gt; 3. Register (A. Read terms of service --&gt; B. Register a passport --&gt; C. Register your X-431 PAD --&gt; D. Fill in user information) --&gt; 4. Diagnose</p>	
<p><b>1 Connections &amp; Power on</b> To diagnose via cable, connect one end of the DBScar USB cable to DBScar connector, and the other end to the USB port of X-431 PAD. No such connections are required for Bluetooth diagnosing. Press the [POWER] button, the system starts initializing, and a message box prompting you to register will appear. Go to Step 2.</p>	<p><b>2 Register</b> Click [Yes] to read terms of service, then click [Agree] to go to Step 3; Click [No] to ignore it and jump to main menu screen. Alternatively, you can click "One-click Update" or "Update Center" to finish your registration later. Note: While registering, be sure that X-431 PAD is connected to Internet.</p>
<p><b>3 Register (Continued)</b> Click the input box (items with * must be filled), then use the soft keyboard to input. After finishing, click [Register], the system will send you a CC No. Follow on-screen instructions to proceed to Step 4. Note: If Authenticate Email is checked, it will send the secret information to your E-mail.</p>	<p><b>4 Register (Continued)</b> Product Serial Number is printed on the bottom of X-431 PAD. While purchasing this product, you will be offered one envelop, in which the register password is kept. You can obtain the dealer code from the dealer. Complete filling and click [Submit] to validate and finish your registration.</p>
<p><b>5 Choose communication way</b> There are 2 diagnosing modes available for your choice. Choose "Diagnosis via Bluetooth", the system will enter Step 6. To perform "Diagnose via Cable", please make sure the DBScar USB cable is properly connected to X-431 PAD and DBScar diagnostic connector. Refer to Step 7.</p>	<p><b>6 Diagnose via Bluetooth</b> <b>Select Vehicle:</b> Enter the vehicle selection interface directly if the DBScar connector to be paired is the one you matched last time. Go to Step 8. <b>Search Bluetooth:</b> search all available Bluetooth devices and choose the desired one to match. Note: The effective communication distance between DBScar connector and X-431 PAD is about 20m while diagnosing via Bluetooth.</p>
<pre> graph TD     A[Diagnose via Cable] --&gt; B[Select vehicle]     A --&gt; C[Select function]     B --&gt; D[Select software version]     C --&gt; D     D --&gt; E[Select test system]     E --&gt; F[Select diagnostic function]     </pre> <p><b>7 Diagnose via Cable</b> Before choosing this mode, make sure all connections are properly made. Follow the flowchart illustrated as above to proceed. Operations of Diagnosis via Cable are similar to diagnosis via Bluetooth. Only search Bluetooth step is not required.</p>	<p><b>8 Start to diagnose</b> Follow the steps described below to diagnose a vehicle: 1. Select vehicle --&gt; 2. Select software version --&gt; 3. Select test system --&gt; 4. Select diagnostic function Note: While diagnosing via Bluetooth, the communication indicators of X-431 PAD and DBScar connector will light up.</p>

### Choose one of the following diagnosing method

#### Wireless(Bluetooth) Connection

Vehicle



Send diagnostic data to X-431 PAD via Bluetooth communication  
Note: The effective communication distance between X-431 PAD and the vehicle is about 20m.



DBScar connector

Bluetooth



X-431 PAD

#### Wired(Cable) Connection

Vehicle



Transmit diagnostic data to X-431 PAD via DBScar USB cable  
Note: Make sure the DBScar USB cable is properly connected to DBScar diagnostic connector and X-431 PAD.



DBScar connector



X-431 PAD

■ Notice:

- 1) Only test for under 14.2V Petrolic vehicle
- 2) Test voltage whether in measurable range or not when Diagnosis socket (self powered) is no power.
- 3) Do not plug diagnosis port when device in diagnostic communications.
- 4) Please refer to the Device Information Manual to get proper operation.
- 5) Working under oscillographic module without electromagnetic interference conditions.

Please refer to X-431 PAD Product Specification for detailed registration, software download upgrade, device operation, installation and commission.

## **4.2 Routine maintenance**

In daily use, the surface of touch screen shall be kept clean, which can be wiped with the cleanser or the wet cloth. The touch screen may drift while using, i.e. the touch is not accurate, which can be calibrated via the touch screen calibration procedure.

## Chapter 5 FAQ

In process of operation of X-431 PAD, you may come across some questions, including the software, hardware, operation and something related to the vehicles. Read the user's manual to get the answer if you have any question. If it can not be solved still, please note it down and contact our Customer Service Center (hotline: +86-0755-84528767) for help.

Here, we list some frequently asked questions and answers on using X-431 PAD.

### 5.1 About Hardware

#### 1Q: Why does the LCD touch screen respond so slowly in cold weather?

A: It is because the ambient temperature is close to the lower limit of operating temperature range (-10-55°C). Under this situation, it is necessary to warm up the machine for 30 minutes before test.

#### 2Q: There is only backlight and no character on the screen. What should I do?

A: Check if the power is well connected. Turn off the machine, unplug the power connector and re-plug it. Turn on the machine after it has been connected to the power for 1 second.

#### 3Q: Why there is no response or response incorrectly while clicking the screen with touch pen?

A: Please calibrate the screen again.

#### 4Q: What can I do when the screen is confused?

A: Please quit the current application (interface), and run it again. If the problem still exists, please restart the system.

#### 5Q: Why can't the data be input after Soft Keyboard is activated?

A: The position where the cursor locates can't be edited. Or you have not activated the cursor in the input position, please use the stylus to click the part to edit. You can input the data if the cursor flashes.

#### 6Q: Why X-431Diagun fails in communication with ECU?

A: Please check and make sure that the diagnostic connector and diagnostic program are matching the vehicle make.

### 5.2 About Software

#### 1Q: System halts when reading data stream. What is the reason?

A: It may be caused by a slackened connector. Please turn off the machine, firmly connect the connector, and switch on the machine again.

#### 2Q: Why X-431 PAD fails in communication with ECU?

A: ECU does not respond. Please try to use the latest update tool to upgrade to the latest diagnostic program.

### **5.3 About System**

#### **1Q: Main screen blinks at the moment when engine ignition.**

**A:** It results from electromagnetic interference and this is normal phenomena.

#### **2Q: Diagnose interrupted during diagnosing process.**

**A:** Caused by electromagnetic disturbing or poor connecting.

#### **3Q: There is no response when communicating with on-board computer.**

**A:** Please confirm the proper voltage of power supply and check if the throttle has been closed, the transmission is in the neutral position, and the water is in proper temperature.

#### **4Q: The systems equipped with the vehicle can not be diagnosed.**

**A:** DLC of some early models is separated; refer to User's Manual for details.

#### **5Q: The fault code storage is blank.**

**A:** Usually, it's the "suquela" for shared circuit. Please locate and analyze the most similar fault code and its circuit.

### **5.4 Other questions**

#### **1Q: The thermal paper can no be fed after being loaded.**

**A:** It is possible to install it improperly. Refer to Chapter 2.3 Printer in the User's Manual or consult from our branch offices or dealers.

#### **2Q: How long is the standby time of battery?**

**A:** Recharge it correctly. In general, the charging time is about 6 hours for new machine. Once the charging icon disappears, it indicates it is fully charged. If standby time is set, it can last for about 5 hours.

#### **3Q: The screen is too white and characters cannot be seen. What is the reason and what should I do?**

**A:** It may be caused by improper contrast. Please refer to the section "Adjust Brightness" to adjust the contrast.

#### **4Q: Why is the machine automatically powered off during standby?**

**A:** It is because the machine has been set for energy saving. Automatic shutdown will take place if the machine is not operated for a specified period of time. Refer to the section "Power option" under System setting in User's Manual.

#### **5Q: Why can't the tested result be printed out?**

**A:** There may be no paper in the printer. Please mount a roll of new paper. See Chapter 2.3

Printer in the User's Manual.

**6Q: Why is there no character on the printing paper?**

A: The paper is mounted reversely. Please take out the paper and mount it again. See Chapter 2.3  
Printer in the User's Manual.

## Chapter 6 Service Policy

### 6.1 Equipment depot repair

#### 6.1.1 Equipment return to factory regulation

1. Equipments can be repaired mean the products of LAUNCH Company
2. Equipments can not be repaired
  - a) Repair without permission of LAUNCH company
  - b) Change the original configuration of LAUNCH company's products (eg. Serial number, language, etc.)
  - c) Dismounting and assembly without permission
  - d) Decipher LAUNCH software without permission
3. After the preliminary determination to faults by the local service personnel, decide return to factory to repair and notify after-sale service department, the after-sale service department can do second judgment.
4. Branch company and customer back to headquarter to repair, the manufacturer quote the price to the branch company, the branch company quote to the customer, the manufacturer can not quote the price to customers.
5. Repair cycle: 4 working days from the day the repair enterprises receive the depot equipment. Manufacturer's repair department receive the products, general faults' repair time is no longer than 4 working days. Special faults' repair time is no longer than 5 working days.
6. After the products are well repaired, manufacturer need to send products to sale enterprises or customers on the day when branch company ensure the capital arrives (no later than the second day).
7. No spare parts inventory's old version equipment, apply old change new policy, equipments no longer in production and without spare parts repair, can buy same series products with a lower price.

#### 6.1.2. Repair Charge

- a) No charges within the warranty period
- b) The logistics cost of the products within the warranty period is payable by the manufacturer.
- c) Same fault appears twice in half a year, the logistics cost is payable by the manufacturer.
- d) Chargeable repairing products, the charge standard is made by the repair enterprises, Repair enterprises notify customers or branch companies. Customers decide whether return the products or disposal regarding to non agreeable products.
- e) Branch company count the last season's back to factory accumulated fees on the first month of every season

### **6.1.3. Overseas Depot Repair**

- a) When the on-site service can not solve customers' problems, customer can ask for depot repair. First, distributors are in charge of repair, if the repair can not be done, then distributor can ask branch company or office for help. If the problems can still not be solved, the branch company can ask help from the manufacturer. Since the journey is very long and customs procedures are very complicated, in general, depot repair is not considered; local repair is preferred.
- b) Product department need to train overseas branch company the "Product Repair Manual". Overseas branch companies need to train its distributors repair methods and policies. In order to make the repair convenient and quick, overseas branch companies can ask for some common drawings for reference. Core drawings are not allowed to apply for. At the mean time, overseas branch companies need to prepare some repair materials.
- c) In general, overseas branch companies would not give the distributors or customers the depot repair service due to customs check, clearance cost and cycle reasons. If the distributors and customers send the problem products to the manufacturer to repair, manufacturer doesn't pay the logistics cost and only provide free repair and free spare parts change for the problem products within the warranty period.

### **6.1.4. Warranty Period Regulation**

- 1. The warranty period is one year and is counted from the day when the purchase receipt is issued. The warranty period of the product that can not provide the receipt is one year but is counted from the day of the product's registration or counted from the day two months after the product leave the factory. The earlier date shall prevail.
- 2. The warranty period of the products that already been repaired or out of warranty period is half a year.

### **6.1.5. Repair Outfit Regulation**

- 1. According to the market requirement, manufacturer shall provide a new product repair outfit to the branch companies.
- 2. New products' repair outfit should be applied by branch companies ; made and sent by the manufacturer.

## **6.2. Spear Parts Management Regulation**

### **6.2.1 Spear Parts Coding Regulation**

- 1. Manufacturer need to provide branch companies the name of spear parts, exploded view, material codes, amount for a piece, material switching time and settlement price.

2. Manufacturer code the new and switched materials, need to be updated in time.
3. Branch companies as per the spear parts list, exploded view made by manufacturer quickly check the spear parts codes.

### **6.2.2 Spear Parts Allocation Regulation**

1. In principle, spear parts are allocated twice a month, to the ones that can not be predicted( not often used or no inventory), a CRM on-site service list is directly generated to apply for spear parts allocation.
2. No signal piece allocation or allocation cost lower than logistics cost is allowed unless it's special occasion.
3. The approval of spear parts allocation need to be finished in one day, at the latest, need to be sent out the next day.
4. The logistics fee for allocation should be paid by the manufacturer.
5. Manufacturer can provide certain amount of free spear parts to distributors according to their sales volume.

### **6.2.3 Spare Parts Claim Regulation**

1. Claim confirmation is performed by the service staff of the branch companies. Have to form detailed "A- market/123 GN product quality claim" or "A-market/124 product quality problem" and directly make "claim application sheet" on the ERP system. Manufacturer is in charge of the warranty control and goods delivery.
2. The returned old pieces can be stored in the branch companies or offices. Branch companies sort out claim list according to on-site service sheet each month.
3. The logistics cost of the claimed spare parts is payable by the manufacturer.
4. The spare parts asked from the supplier should all come back to manufacturer, logistics cost should be payable by the supplier.
5. The price volume lower than 30 Yuan is no need to return old pieces, branch companies can cancel after verification.

### **6.2.4 Spear Parts Inventory Regulation**

1. Inventory spear parts contain fragile and consumable parts and main spear parts.
2. The free allocated spear parts only indicate fragile and consumable parts of lifting machine. Branch companies place the gift purchasing order to the manufacturer. The price is 0, manufacturer makes gift sales order and sends goods leave warehouse.

3. The free allocated spare parts are governed by 0.2% of the last year's sales volume. Branch companies can make the detailed spare parts that's needed within the regulated amount. Manufacturer will directly send to branch companies.
4. The main spare parts inventory is used for timely turnover of customers' claim. Each area can prepare a suitable amount of spare parts and timely write off according to their monthly turnover.

### **6.2.5 Overseas Spare Parts Management**

1. Manufacturer need to prepare some free spare parts to serve for overseas branch companies. Quota is 1% of the sales volume. Overseas branches can only purchase spare parts not finished products. Quota can be accumulated. If the purchase amount exceeds quota, overseas branches need to pay manufacturers for the exceeded parts.
2. Overseas branches need to establish its spare parts safety inventory. Overseas branches place spare parts purchase order to overseas sales assistant first day of every month. Overseas sales assistants place official purchase order to manufacturer on the ERP system. Overseas sales assistants need to follow the execution of the order.
3. Overseas branches need to constantly understand distributors' spare parts inventory, If the spare parts is not enough, overseas branches need to push the distributor to purchase the spare parts and supplement spare parts inventory. Improve customer's efficiency and satisfaction.
4. Overseas branches need to obey the material codes on the "product installation, adjustment and spare parts manual" to purchase the spare parts. If the spare parts are changed, we need to timely understand the ECN released by the product department and check the spare parts codes through IO system so as to avoid misorder the spare parts.
5. If the spare parts change is within the warranty period, the service department of the sales units needs to ask manufacturer for claim. The procedure is in the spare parts claim procedure.

### **6.3. Quality Claim Regulation**

1. The service manager and engineer directly generate product quality claim report on the CRM system if it belongs to one of the following situations:
  - a) Fault appears within one month after the purchase date.
  - b) Many repair appears for one product within half a year.
  - c) Lack spare parts after the new product is received, or new product has defects due to manufacture.
  - d) If the product function can't satisfy customers'requielements due to products' design.
2. Service specialist of the head quarter is in charge of the supervision of the execution process of the claim report.
3. The quality department of the head quarter is in charge of the execution of the claim report, submit emergency solution, adjust precaution measures and reply customers.

4. Service staff of the branch companies has the right to decide whether shut down the claim sheet according to treatment result and the satisfaction degree of the adjustment of precaution measures.
5. All the quality claims need to be replied within 3 hours.
6. Manufacturer should bare the after sale service fee and compensation fee due to severe quality problems.
7. Manufacturer needs to bare the cost of batch call-back due to product quality problems and change products.

See "12 HOM 1301 0611A customer claim management regulation